

## CLAIMS

1. A radio cell station apparatus to which a plurality of personal stations can establish space division multiple access, said radio cell station apparatus transmitting to  
5 and receiving from each of said plurality of personal stations a signal including an already-known reference signal different for each personal station, comprising:

multiplexed connection number detection means (40) for detecting number of multiplexed connections of the personal stations establishing space division multiple access; and

10 means (40) for allocating, by switching the reference signals that have been allocated to the personal stations establishing space division multiple access respectively prior to change in the number of multiplexed connections to reference signals capable of maintaining communication quality even after the number of multiplexed connections is changed, the switched reference signals to said plurality of personal stations respectively,  
15 when change in the number of multiplexed connections is detected in said multiplexed connection number detection means (40).

2. The radio cell station apparatus according to claim 1, further comprising storage means (50) for storing a reference signal optimized for each number of multiplexed connections of the personal stations establishing space division multiple access, wherein  
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when the number of multiplexed connections of the personal stations establishing space division multiple access is changed, said reference signal allocation means (40) selects reference signals optimal for the changed number of multiplexed connections  
25 from said storage means (50) and allocates the selected reference signals to said plurality of personal stations respectively.

3. The radio cell station apparatus according to claim 2, wherein

5            said reference signal stored in said storage means (50) is calculated for each number of multiplexed connections based on a high autocorrelation characteristic and a low cross-correlation characteristic.

10          4. A personal station establishing space division multiple access to a radio cell station apparatus, said personal station transmitting to and receiving from said radio cell station apparatus a signal including an already-known reference signal different for each personal station, comprising:

15          means for receiving a request for switching a reference signal from said radio cell station apparatus in accordance with change in the number of multiplexed connections of the personal stations establishing space division multiple access; and

20          means for switching the reference signal to a reference signal capable of maintaining communication quality even after the number of multiplexed connections is changed and transmitting a response to the request for switching to said radio cell station apparatus.

25          5. The personal station according to claim 4, further comprising storage means for storing a reference signal optimized for each number of multiplexed connections of the personal stations establishing space division multiple access, wherein

30          when the request for switching the reference signal is received from said radio cell station apparatus, a reference signal optimal for the changed number of multiplexed connections is selected from said storage means and a response to the request for switching including the selected reference signal is transmitted to said radio cell station apparatus.

35          6. The personal station according to claim 5, wherein  
                  said reference signal stored in said storage means is calculated for each number of multiplexed connections based on a high autocorrelation characteristic and a low

cross-correlation characteristic.

7. A method of controlling a reference signal performed by a radio cell station apparatus to which a plurality of personal stations can establish space division multiple access, said radio cell station apparatus transmitting to and receiving from each of said plurality of personal stations a signal including an already-known reference signal different for each personal station, comprising the steps of:

detecting number of multiplexed connections of the personal stations establishing space division multiple access; and

when change in the number of multiplexed connections is detected in said step of detecting the number of multiplexed connections, switching the reference signals that have been allocated to the personal stations establishing space division multiple access respectively prior to change in the number of multiplexed connections to reference signals capable of maintaining communication quality even after the number of multiplexed connections is changed, and allocating the reference signals to said plurality of personal stations respectively.

8. The method of controlling a reference signal according to claim 7, further comprising the step of storing a reference signal optimized for each number of multiplexed connections of the personal stations establishing space division multiple access, wherein

when the number of multiplexed connections of the personal stations establishing space division multiple access is changed, reference signals optimal for the changed number of multiplexed connections that have been stored are selected and the selected reference signals are allocated to said plurality of personal stations respectively.

9. The method of controlling a reference signal according to claim 8, wherein the step of storing a reference signal optimized for each number of multiplexed

connections of the personal stations establishing space division multiple access further includes the step of calculating a reference signal for each number of multiplexed connections based on a high autocorrelation characteristic and a low cross-correlation characteristic.

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10. A method of controlling a reference signal performed by a personal station establishing space division multiple access to a radio cell station apparatus, said personal station transmitting to and receiving from said radio cell station apparatus a signal including an already-known reference signal different for each personal station,

10 comprising the steps of:

receiving a request for switching a reference signal from said radio cell station apparatus in accordance with change in the number of multiplexed connections of the personal stations establishing space division multiple access; and

15 switching the reference signal to a reference signal capable of maintaining communication quality even after the number of multiplexed connections is changed and transmitting a response to the request for switching to said radio cell station apparatus.

11. The method of controlling a reference signal according to claim 10, further comprising the step of storing a reference signal optimized for each number of 20 multiplexed connections of the personal stations establishing space division multiple access, wherein

when the request for switching the reference signal is received from said radio cell station apparatus, a reference signal optimal for the changed number of multiplexed connections that has been stored is selected and a response to the request for switching 25 including the selected reference signal is transmitted to said radio cell station apparatus.

12. The method of controlling a reference signal according to claim 11, wherein

the step of storing a reference signal optimized for each number of multiplexed connections of the personal stations establishing space division multiple access further includes the step of calculating a reference signal for each number of multiplexed connections based on a high autocorrelation characteristic and a low cross-correlation

5 characteristic.

13. A program for controlling a reference signal performed by a radio cell station apparatus to which a plurality of personal stations can establish space division multiple access, said radio cell station apparatus transmitting to and receiving from each 10 of said plurality of personal stations a signal including an already-known reference signal different for each personal station, causing a computer to execute the steps of:

detecting number of multiplexed connections of the personal stations establishing space division multiple access; and

15 when change in the number of multiplexed connections is detected in said step of detecting the number of multiplexed connections, switching the reference signals that have been allocated to the personal stations establishing space division multiple access respectively prior to change in the number of multiplexed connections to reference signals capable of maintaining communication quality even after the number of multiplexed connections is changed, and allocating the reference signals to said plurality 20 of personal stations respectively.

14. The program for controlling a reference signal according to claim 13, further causing the computer to execute the step of storing a reference signal optimized for each number of multiplexed connections of the personal stations establishing space 25 division multiple access, wherein

when the number of multiplexed connections of the personal stations establishing space division multiple access is changed, reference signals optimal for the changed number of multiplexed connections that have been stored are selected and the selected

reference signals are allocated to said plurality of personal stations respectively.

15. The program for controlling a reference signal according to claim 14,  
wherein

5           the step of storing a reference signal optimized for each number of multiplexed  
connections of the personal stations establishing space division multiple access further  
causes the computer to execute the step of calculating a reference signal for each  
number of multiplexed connections based on a high autocorrelation characteristic and a  
low cross-correlation characteristic.

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16. A program for controlling a reference signal performed by a personal  
station establishing space division multiple access to a radio cell station apparatus, said  
personal station transmitting to and receiving from said radio cell station apparatus a  
signal including an already-known reference signal different for each personal station,  
15           causing a computer to execute the steps of:

receiving a request for switching a reference signal from said radio cell station  
apparatus in accordance with change in the number of multiplexed connections of the  
personal stations establishing space division multiple access; and

20           switching the reference signal to a reference signal capable of maintaining  
communication quality even after the number of multiplexed connections is changed and  
transmitting a response to the request for switching to said radio cell station apparatus.

17. The program for controlling a reference signal according to claim 16,  
further causing the computer to execute the step of storing a reference signal optimized  
25           for each number of multiplexed connections of the personal stations establishing space  
division multiple access, wherein

when the request for switching the reference signal is received from said radio  
cell station apparatus, a reference signal optimal for the changed number of multiplexed

connections that has been stored is selected and a response to the request for switching including the selected reference signal is transmitted to said radio cell station apparatus.

18. The program for controlling a reference signal according to claim 17,

5 wherein

the step of storing a reference signal optimized for each number of multiplexed connections of the personal stations establishing space division multiple access further causes the computer to execute the step of calculating a reference signal for each number of multiplexed connections based on a high autocorrelation characteristic and a  
10 low cross-correlation characteristic.